

CHANGES IN NOMENCLATURE AND CLASSIFICATION OF SOME OPIINE BRACONIDAE (HYMENOPTERA)¹

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Abstract.—Lectotypes are designated for 13 species of opiine Braconidae and a neotype is designated for *Bracon carbonarius* Nees von Esenbeck, 1834. Three genera are transferred to the Opiinae: *Baeocentrum* Schulz and *Coeloreuteus* Roman from the Rogadinae, and *Neodiospilus* Szépligeti from the Helconinae. All are synonyms of *Opius* Wesmael. *Diachasmimorpha* Viereck and *Psytalia* Walker are elevated to generic rank in the Opiinae, and *Austroopius* Szépligeti is placed as a subgenus of *Psytalia*. *Rhynchosteres* (***Fopius***), New Subgenus, is described for several Ethiopian species previously referred to *Biosteres*. Four species of *Opius* are renamed, one new species, ***Rhynchosteres silvestrii***, parasitic on Tephritidae is described, and 12 taxa are newly synonymized. Repositories are listed for the types of three species previously treated as nomina nuda or nomina dubia.

Fischer (1963a, 1966, 1972, 1977) revised the opiine Braconidae from all major geographic regions of the World, and published a catalog of the known species (Fischer, 1971). Over the past 30 years, Fischer has also redescribed almost all of the older opiine species, thus providing a uniform format for comparison. His works are of particular value in pinpointing repositories for type specimens, and in clarifying the status of many uncertain species. A few problems still remain, however (e. g. Fischer, 1971, pp. 130-132), and the purpose of the present work is to solve some of these.

The following abbreviations are used for museums: IRSN, Institut Royal des Sciences Naturelles de Belgique, Bruxelles (Wesmael Collection); TAMU, Texas A&M University, College Station; ZMHB, Zoologisches Museum der Humboldt Universität, East Berlin (Foerster Collection);

BMNH, British Museum (Natural History), London; CNC, Canadian National Collection, Ottawa; NRS, Naturhistoriska Riksmuseet, Stockholm; WIEN, Naturhistorisches Museum, Vienna; USNM, U.S. National Museum of Natural History, Washington, D.C. All of the lectotypes designated herein have been so labelled by me.

Baeocentrum Schulz, 1911

Szépligeti (1907) established the monotypic genus *Brachycentrus* for a species collected by M. Rothschild in British East Africa. Szépligeti placed this genus in the Rogadinae. Schulz (1911), noting that *Brachycentrus* was preoccupied, renamed Szépligeti's genus as *Baeocentrum*. The type species, *minutus* Szépligeti, 1907, was described from two specimens. One of these, bearing Rothschild's blue locality label, a printed type label, and Szépligeti's handwritten type label, is in the Muséum National d'Histoire Naturelle, Paris. I hereby designate this specimen as lectotype. The specimen matches Szépligeti's original de-

¹ Approved as TA #21733 by the Texas Agricultural Experiment Station.

scription, except that the specimen is a male and Szépligeti's description is of a female. The male genitalia are strongly protruding in this specimen, however, and this feature apparently misled Szépligeti. The paralectotype (with metasoma missing) is conspecific, and located in the Hungarian Natural History Museum, Budapest. This species is clearly a member of the genus *Opius s. l.*, as characterized by Fischer (1972). I therefore consider *Baeocentrum* to be a junior synonym of *Opius*, **New Synonym**. *Opius minutus* (Szépligeti), **New Combination**, (not *minutus* Granger, 1949, see below) fits the characterization of the subgenus *Phlebosema* Fischer, 1972. In Fischer's (1972) classification, *Phlebosema* thus becomes a junior subjective synonym of *Baeocentrum*.

Coeloreuteus Roman, 1910

This genus was established by Roman (1910) for *Atoreuteus africanus* Szépligeti, 1908, and placed in the Exothecinae. Shenefelt (1975) retained it in the Rogadinae. I have examined the holotype of *africanus* (in the NRS), and it belongs in *Opius s. l.* (as characterized by Fischer, 1972). The absence of the mid-dorsal portion of the occipital carina, the flat, exposed labrum, and the fore wing venation all support this placement. I therefore consider *Coeloreuteus* to be a junior synonym of *Opius*, **New Synonym**. I have not examined the other species listed under *Coeloreuteus* (Shenefelt, 1975) to determine their placement.

Diachasmimorpha Viereck, 1913

Gahan (1915) synonymized *Diachasmimorpha* with *Opius*. Fullaway (1951) was the first to subsequently recognize this distinctive group of tephritid parasitoids, which he called the *Opius longicaudatus* group (or group 1). Fullaway (1951) characterized this group by the presence of a postnervellus in the hind wing and the deep but unsculptured notauli. Wharton and Gilstrap (1983) referred to this as the *tryoni* species group,

transferred several species to it, and treated some of those included by Fullaway (1951) as synonyms of *longicaudatus* Ashmead. Wharton and Gilstrap (1983) further characterized this group on the basis of the apically sinuate ovipositor. *Diachasmimorpha tryoni* (Cameron), **New Combination**, is clearly a member of this group based on the shape of the ovipositor, wing venation, body sculpture, and shape of the clypeus, despite the almost complete absence of an occipital carina. Fischer (1967a) used the absence of an occipital carina as the basis for his genus *Parasteres*. Since the type species of *Parasteres* is a synonym of *tryoni* (Wharton and Marsh, 1978), however, *Parasteres* becomes a junior subjective synonym of *Diachasmimorpha*, **New Synonym**. The genus *Diachasmimorpha* is very similar to the Neotropical genus *Doryctobracon* Enderlein, 1920, based on similarities in clypeal morphology (lower margin of clypeus more or less sinuate, ventral-lateral margin of clypeus completely separated from face ventrad of the anterior tentorial pit). *Doryctobracon* lacks the sinuate ovipositor of *Diachasmimorpha*, and generally has the recurrent vein antefurcal to interstitial rather than the postfurcal insertion of *Diachasmimorpha*. The clypeal morphology and fore wing venation are, in my opinion, sufficient for removing *Diachasmimorpha* from *Biosteres*, where it has been placed by all recent authors (e.g. Fischer, 1972; Wharton and Marsh, 1978).

Hexaulax Cameron, 1910

Fischer (1971, p. 130) was unable to place this monotypic genus, stating only that it belonged "to the Opiinae according to Muesebeck." Muesebeck (1967, p. 48), however, treated *Hexaulax* as a synonym of *Opius* on the authority of Fischer (1964). A clearly labelled specimen of *Hexaulax ruficeps* Cameron, 1910 (type species by monotypy of *Hexaulax*), collected by Fruhstorfer and from the type locality in

Java, and bearing a co-type label, is now in the BMNH. This specimen belongs to *Opius s. l.*, as interpreted by Fischer (1972), but cannot readily be assigned to a subgenus because a pin through the mesonotum makes it impossible to determine whether or not a midpit is present. Cameron stated in his original description that the occiput was not margined. The apparent absence of an occipital carina is an artifact, however, due to the head being pinched in the occipital region. Traces of the carina can still be seen on close inspection. Because of this occipital feature, the matching locality label, and the lack of evidence in the original description that more than one specimen was involved, this specimen may be the holotype. However, in order to alleviate any confusion in the future, I am treating it as a lectotype, and hereby designate it as such.

Lytacra Foerster, 1862

Fischer (1959) stated that the type of *Lytacra stygia* Foerster, the type species of *Lytacra*, was lost. Fischer (1971) repeated this statement and placed *stygia* in *Ademon* Haliday, 1833 based on Foerster's original description. A single female from Foerster's collection, labelled *Lytacra stygia*, is now present in the ZMHB; and I believe this to be the specimen on which Foerster (1862) based his description. The tips of the wings are missing and Foerster's characterization of the radial cell incompletely closed (and thus similar to the condition in *Ademon*) is therefore misleading (and in fact incorrect). Foerster's specimen is identical to the lectotype and paralectotype of *Diachasma caffer* (Wesmael) in the IRSN. I therefore consider *stygia* to be a junior synonym of *caffer*, **New Synonym**, and *Lytacra* thus becomes a synonym of *Diachasma*.

Neodiospilus Szépligeti, 1911

Szépligeti (1911) included two species (*terebrator* Szépligeti, 1911 and *flavipes* Szépligeti, 1911) in his original description of *Neodiospilus*. Brues (1926) subsequently

designated *flavipes* as the type species. Shenefelt (1970), following Szépligeti (1911), placed *Neodiospilus* in the Diospilini, and listed the holotype of *flavipes* as being in the NRS. A search for this specimen in Stockholm in 1984 was unsuccessful. However, a female collected by Fuelleborn from the type locality in Langenburg on Lake Nyasa is now in the ZMHB. It bears a red type label, and a determination label in Szépligeti's handwriting which reads "Neodiospilus luteipes m"; and it matches Szépligeti's original description of *flavipes*. In the drawer near this specimen is an old note saying the label = luteipes but the MS = flavipes. In the same drawer are the male and female syntypes of *Neodiospilus terebrator*, both with Szépligeti determination labels. I have no doubt that these are the specimens used by Szépligeti as the basis for his description of *Neodiospilus*, and consider the specimen labelled as *luteipes* to be the holotype of *flavipes*. Both *flavipes* and *terebrator* are opiines, and belong in *Opius s. l.* as interpreted by Fischer (1972). *Neodiospilus* thus becomes a junior synonym of *Opius*, **New Synonym**. There are pins obliterating the mesonotal regions of the *flavipes* and *terebrator* specimens. The two species thus cannot readily be assigned to a subgenus, though it is clear from the clypeal morphology and wing venation that they should belong to different subgenera in Fischer's (1972) classification.

Szépligeti (1914), in an apparent lapsus, described another genus with the name *Neodiospilus*. The type series for the two included species, *baumanni* Szépligeti and *zenkeri* Szépligeti, are also in the ZMHB. Shenefelt (1970) renamed *Neodiospilus* Szépligeti, 1914 as *Repetiodiospilus*. It is correctly placed in the Diospilini (as presently understood).

Psytalia Walker, 1860

Muesebeck (1931) synonymized *Psytalia* with *Opius*, and renamed the type species *walkeri* Muesebeck. Fischer (1971) listed

Psytalia under *Opius*, but inadvertently omitted *walkeri* from his species catalog. Fischer (1972) treated *Psytalia* as a subgenus of *Opius*. *Psytalia walkeri* belongs to the *concolor* species group as characterized by Wharton and Gilstrap (1983). As noted by Wharton and Gilstrap (1983), the *concolor* and *fletcheri* species groups share a number of characters suggestive of a close relationship. In addition to characters noted by Fischer (1972), these include reduced mesonotal sculpture, large, attenuate hypopygium, short clypeus, exposed labrum with reduced setation, and identical hind wing venation. I believe these characters are sufficient to elevate *Psytalia* to generic rank in the Opiinae, with *Austroopius* Szépligeti, 1900 included as a subgenus. Members of the subgenus *Psytalia* (= *concolor* species group) generally have the gaster weakly sculptured, at least basally, while in the subgenus *Austroopius* (= the *fletcheri* species group) the recurrent vein is somewhat bowed. I do not consider the thickening of the first cubital cross-vein adequate for separating the species formerly included in *Austroopius* (e. g. Fischer, 1963b, 1966) from closely related species, such as *fletcheri* Silvestri and *incisi* Silvestri, which lack this thickening.

Opius africanus Szépligeti, 1910

With the transfer of *Coeloreuteus* to *Opius* (see above), *Opius africanus* (Szépligeti, 1908) becomes a senior secondary homonym of *Opius africanus* Szépligeti, 1910. The latter is therefore renamed *Opius tephritivorus*, **New Name**. *Opius tephritivorus* is a member of the subgenus *Utetes* Foerster, as characterized by Fischer (1972), and is at least subgenerically different from *africanus*.

Pachytheclus albobalteatus Cameron, 1912

This species was transferred to *Biosteres* by Fischer (1967b). The sculpture and general color pattern of the male holotype in

the BMNH (BM type # Hym. 3.c.711) are the same as that of *angaleti* Fullaway, 1952. Although the mid coxae tend to be darker in most specimens of *angaleti* that I have seen, I can find no other differences, and therefore treat *angaleti* as a junior subjective synonym of *albobalteatus*, **New Synonym**. The **New Combination** is *Diachasmimorpha albobalteatus* (Cameron). The type locality of *albobalteatus* is "Borneo," that of *angaleti* North Borneo (= Sabah).

Diachasma brevistyli Paoli, 1934

Fischer (1971) treated *brevistyli* as a nomen nudum, referring only to a subsequent note on *brevistyli* by Martelli (1937). Through the courtesy of the librarians at the Museum "La Specola" in Firenze, Italy, I was able to locate Paoli's (1934) original description, and therefore consider it (as well as *Phanerotoma somalica* Paoli, 1934) to be a validly described species. The type series of *brevistyli* is in the Museum "La Specola." This species is almost identical to *Biosteres carinatus* Szépligeti, 1910; and the generic placement of these two species is currently under investigation.

Opius caffer Wesmael, 1835

Wesmael (1835) described *caffer* on the basis of two specimens, a male and a female. Both are in excellent condition in the IRSN. The female is hereby designated as lectotype. It bears the following labels: top label: Coll. Wesmael (printed); 2nd label: 1865 (printed); 3rd label: *Opius caffer* mihi (handwritten) dét. C. Wesmael (printed); 4th label: Type (printed in red).

Bracon carbonarius Nees von Esenbeck, 1834

See *procerus* Wesmael (below).

Biosteres carinatus Szépligeti, 1910

I have examined the holotype male in the NRS and am unable to separate this species from *Hedylus giffardii* Silvestri (as charac-

terized by Wharton and Gilstrap, 1983). I therefore consider *giffardii* to be a junior subjective synonym of *carinatus*, **New Synonym**. See additional comments under *brevistylis* (above).

Opius cingulatus Wesmael, 1835

This is the type species (by original designation) of *Nosopoea* Foerster, 1862. Wesmael (1835) described *cingulatus* on the basis of 14 specimens. Eleven specimens, bearing identical type and determination labels, but representing at least three species, are now present in the IRSN. I hereby designate as lectotype one of four females most closely matching the original description, and bearing the following labels: top label: 1832 (printed); 2nd label: Coll. Wesmael (printed); 3rd label: Type (printed in red); 4th label: ♂ *Opius* ♀ *cingulatus*. mihi (hand-written) dét. C. Wesmael (printed). The lectotype agrees with Fischer's (1972) definition of *cingulatus*; and also fits the concept of *cingulatus* used by Haliday (1837), Foerster (1862), Marshall (1891) and Thomson (1895). The lectotype has the hypostomal and occipital carinae widely separated at the mandible, and the mandible bears a carinate ridge basally on its ventral border. Paralectotypes which are not conspecific have the oral and occipital carinae meeting near the base of the mandible, the sternaulus at least weakly sculptured, and/or a broad basal lobe ventrally on the mandible (as in *O. pallipes* Wesmael or *O. crassipes* Wesmael).

Opius coffeae Fischer, 1962

I have been unable to locate the holotype of *coffeae*, but a paratype in the Naturhistorisches Museum, Basel is identical to the lectotype of *Biosteres caudatus* Szépligeti, 1913. I therefore treat *coffeae* as a junior subjective synonym of *caudatus*, **New Synonym**. If the holotype is ever located, it should be examined to confirm this synonymy. This species is characterized by the narrow patch of deep punctures between eye

and ocelli (Wharton and Gilstrap, 1983, Fig. 12). Generic placement is discussed below under *silvestrii*, n. sp.

Opius comatus Wesmael, 1835

This is the type species (by original designation) of *Holconotus* Foerster, 1862. Ashmead (1900) later proposed the name *Aulonotus* for Foerster's *Holconotus*, which was preoccupied. Wesmael (1835) described *comatus* on the basis of 11 specimens. There are now eight specimens in IRSN, two of which fit the description of Wesmael's var. 1. I hereby designate as lectotype of *comatus* the female bearing R. Koenig's 1968 lectotype label. Koenig unfortunately never published a lectotype designation for this species. The specimen has the following additional labels: top label: Coll. Wesmael (printed); 2nd label: 1860 (printed); 3rd label: ♂ *Opius* ♀ *comatus*. mihi (hand-written) dét. C. Wesmael (printed); 4th label: Type (printed in red); 5th label: R. I. Sc. N. B. I. g. 3.317; 6th label: LECTOTYPE *Opius comatus* Wesmael ♀ désigné par R. König 1968.

There are two more females bearing type and *comatus* determination labels (including the additional specimen of var. 1) than listed by Wesmael (1835) in the original description. It is not possible at present to determine whether specimens were added after the original description, or Wesmael erred in listing the sexes. Labelling of paralectotypes has therefore been conservative.

Opius crassipes Wesmael, 1835

This is the type species (by original designation) of *Hypocynodus* Foerster, 1862. Wesmael (1835) described *crassipes* on the basis of a single female, and also indicated that he had a male which possibly belonged to this species. In the Wesmael Collection there are now two females plus a third specimen lacking an abdomen. All bear *Opius crassipes* type labels. The two intact females are not conspecific, however, and I have

labelled the one that fits Wesmael's original description as the holotype.

***Neodiospilus flavipes* Szépligeti, 1911**

Since *flavipes* is preoccupied in *Opius* by *flavipes* Szépligeti, 1898, it becomes necessary to rename the junior homonym following transfer of the type species of *Neodiospilus* to *Opius* (see above). It is therefore renamed *Opius sepivalvus*, **New Name**. The specific epithet is an arbitrary combination of letters.

***Opius irregularis* Wesmael, 1835**

This is the type species of *Allotypus* Foerster, 1862. Wesmael (1835) described *Opius irregularis* on the basis of one male and five females. Six specimens (2 ♂, 4 ♀) matching his original description and bearing identical type and determination labels are in the IRSN. These specimens also bear the lectotype and paralectotype labels of R. Koenig. Unfortunately, Koenig's lectotype designation has never been published. Koenig labelled a male as lectotype, but I believe the female offers better characters for species discrimination. I therefore designate as lectotype a female with the following labels: top label: Coll. Wesmael (printed); 2nd label: 1847 (printed); 3rd label: ♂ *Opius* ♀ *irregularis* mihi (hand-written) dét. C. Wesmael (printed); 4th label: Type (printed in red); 5th label: PARALECTOTYPE *Opius irregularis* Wesmael ♀ désigné par R. König 1968.

***Opius levis* Wesmael, 1835**

This is the type species of the subgenus *Opiothorax* Fischer, 1972. Wesmael (1835) described *Opius levis* on the basis of seven specimens. There are now six specimens in the IRSN. I hereby designate as lectotype the female labelled by Koenig in 1968 as lectotype (but never published). The specimen has the following additional labels: top label: Coll. Wesmael (printed); 2nd label: 1835 (printed); 3rd label: *Opius levis* mihi. ♂. ♀ (hand-written) dét. C. Wesmael (print-

ed); 4th label: Type (printed in red); 5th label: R. I. Sc. N. B. I. G. 3.317; 6th label: LECTOTYPE *Opius levis* Wesmael ♀ désigné par R. König 1968. Fischer (1972) records this as a color-variable species, but specimens with dark hind coxae will not run to *levis* in his key (Fischer 1972, p. 441). Wesmael (1835) specifically mentions the dark coxae in his original description; all members of the type series have this feature.

***Rhogadopsis miniacea* Brèthes, 1913**

This is the type species (by monotypy) of *Rhogadopsis* Brèthes, 1913. It was transferred to *Opius* by de Santis (1967). I designate as lectotype a female in the Museo "Bernardino Rivadavia" (Buenos Aires) with a single label in Brèthes' handwriting which reads *Rhogadopsis miniacea* Br. The species runs to the *tucumanus*-group of *Lisosema* in Fischer (1977). *Rhogadopsis* thus becomes a senior synonym of the subgenus *Lisosema* Fischer, 1972, **New Synonym**.

***Opius minutus* Granger, 1949**

It becomes necessary to rename the junior homonym following transfer of *Brachycentrus minutus* Szépligeti, 1907 to *Opius* (see above). *Opius minutus* Granger is therefore renamed *Opius gregnar*. The specific epithet is an arbitrary rearrangement of the name Granger.

***Opius pallipes* Wesmael, 1835**

This is the type species (by subsequent designation of Muesebeck and Walkley, 1951), of *Opius* Wesmael, 1835. Wesmael (1835) described this species on the basis of 15 females and five males. There are now 19 specimens in the IRSN. I designate as lectotype a female with abdomen mounted beneath the rest of the specimen on a separate card, and characterized by an exceptionally smooth petiole and propodeum, 24 segmented antenna (right side, left side broken), and pale clypeus. This characterization fits just within the range of variation given for this species by Wesmael. The lec-

otype was selected specifically on the basis of the sculptural characters of the petiole and propodeum so as to more clearly define this species. It should be pointed out, however, that studies on intraspecific variation in sculptural features have not been conducted for this species and are desperately needed. The diverse array of host records for *pallipes* (e. g. Fischer, 1971) suggests that some confusion has existed in the past regarding the application of this name. It is hoped that restriction of the definition of *pallipes* by means of this lectotype designation will enable future workers to more accurately identify this species; and that this in turn will lead to a re-examination of published host records. The species is of potential use in biological control of *Liriomyza* (Hendrikse, 1980). The lectotype bears the following labels: top label: Coll. Wesmael (printed); 2nd label: 1831 (printed); 3rd label: ♂ *Opius* ♀ *pallipes* mihi (hand-written) dét. C. Wesmael (printed); 4th label: Type (printed in red).

Opius procerus Wesmael, 1835

Wesmael (1835) described this species from two individuals. There are still two specimens (both male) of this species in the IRSN labelled as types. I hereby designate as lectotype the male bearing R. Koenig's *Opius carbonarius* (Nees) determination label. It has the following additional labels: top label: Coll. Wesmael (printed); 2nd label: 1872 (printed); 3rd label: *Opius procerus*. mihi ♂ (hand-written) dét. C. Wesmael (printed); 4th label: Type (printed in red). I designate this specimen as also the neotype of *Bracon carbonarius* Nees von Esenbeck, 1834. The vast majority of Nees von Esenbeck's collection, including the type(s) of *carbonarius*, have been destroyed (e. g. Shenefelt, 1970; Papp, 1985; and Van Achterberg, pers. comm.). Haliday (1837) treated *procerus* Wesmael as a synonym of *carbonarius* Nees, and I consider Haliday as the first reviser relative to the establishment of a fixed concept for *carbonarius*. Al-

though this concept is in agreement with the latest treatment of *carbonarius* (Fischer, 1977), at least two major authors (Wesmael, 1835; Thomson, 1895) have interpreted *carbonarius* differently. *Bracon carbonarius* is the type species of *Biosteres* Foerster, 1862. The subgeneric concepts used by Fischer (1972) for *Biosteres* are based on Haliday's interpretation of *carbonarius*, and are therefore in conflict with the interpretations of Wesmael and Thomson. A neotype designation for *carbonarius* will resolve this conflict. Fischer (1972, 1977) has presented keys for the separation of *carbonarius* from closely related species.

Opius ruficeps Wesmael, 1835

This is the type species (by original designation) of *Therobolus* Foerster, 1862. Wesmael (1835) described this species from two specimens. There are now three specimens in the Wesmael Collection, all bearing the identical type and determination labels noted above for other Wesmael species. I hereby designate as lectotype a female having an additional label with the hand-written number 3 on it.

Hexaulax ruficeps Cameron, 1910

Transfer of the type species of *Hexaulax* to *Opius* results in a secondary homonym. I therefore rename *ruficeps* Cameron (not *ruficeps* Wesmael, 1835) as *Opius indentatus*, New Name, in reference to the damaged lectotype and misleading original description (Cameron, 1910) resulting therefrom.

Celiestiella testaceipes Cameron, 1903

This is the type species (by monotypy) of *Celiestiella* Cameron, 1903. Cameron (1903) mentioned only the male sex in his extremely brief description of this species. However, the clearly labelled type series in the BMNH (BM type # Hym 3.c.713) consists of two males and one female. Of the two males, one is damaged by the pin. I therefore designate the other male as lectotype. Fischer (1967b) redescribed this

species from the female, and transferred it to *Biosteres*. I agree with this placement.

***Opius testaceus* Wesmael, 1838**

This is the type species (by original designation) of *Uteles* Foerster, 1862. Wesmael (1838) described this species from four females and one male, but there are now only three specimens in the IRSN. I hereby designate as lectotype the remaining intact female. It bears the following labels: top label: 119. (hand-written); 2nd label: Coll. Wesmael (printed); 3rd label: Type (printed in red); 4th label: *O. testaceus*. mihi (hand-written) dét. C. Wesmael (printed); 5th label: cf. *Opius* (hand-written) Rév. J. A. Marshall (printed) 1887 (hand-written).

***Biosteres testaceus* Szépligeti, 1914**

I have examined the holotype female in the ZMHB, and am unable to separate this species form *Biosteres fullawayi* Silvestri, 1913. I therefore treat *testaceus* Szépligeti as a junior subjective synonym of *fullawayi*, **New Synonym**. This species was recently diagnosed by Wharton and Gilstrap (1983). It's generic placement is currently under investigation.

DESCRIPTION OF NEW TAXA

Most of the Ethiopian and Indo-Pacific species currently placed in *Biosteres* are not readily accommodated by the existing opiine classification. Most authors, following Fischer (1963a, 1966), have placed the included species in *Biosteres* on the basis of the short second cubital cell. However, this feature is inadequate for characterizing opiine genera. Closer examination of the wing venation shows that there are significant differences between *Biosteres s. s.* and these Ethiopian and Indo-Pacific species. The most obvious difference is in the shape of the stigma. It is longer and narrower in *Biosteres s. s.*, with the first radial segment arising basad of the midpoint. The postnervellus is also greatly reduced in *Biosteres s. s.*, and is often only barely visible as a

weakly infumate crease. Other major differences are in the shape of the mandible, which has a basal tooth in *Biosteres s. s.*; and in the host preferences.

Some of the Indo-Pacific species formerly placed in *Biosteres* have now been transferred to *Diachasmimorpha* (see above). Based on the differences enumerated in the preceding paragraph, I believe most of the remaining Indo-Pacific and Ethiopian species are more closely related to *Diachasmimorpha* and *Rhynchosteres* Fischer, 1965 than to *Biosteres s. s.* I prefer to retain *Diachasmimorpha* as restricted by the definition given earlier in this paper. Since the new species described below does not fit this restricted definition, I have placed it in *Rhynchosteres*.

***Rhynchosteres* Fischer, 1965**

***Fopius* Wharton, NEW SUBGENUS**

Type species: Rhynchosteres silvestrii, new species.

Occipital carina absent dorsally, but well-developed laterally; oral and hypostomal carinae widely separated at mandible. Labral setae sparse, confined to ventral and lateral margins; labrum concealed by large, somewhat hemispherical clypeus with convex to nearly truncate lower margin; margin of clypeus extending ventrally from anterior tentorial pit somewhat reflected, and separated from gena by a sharp groove. Mandibles gradually and evenly tapering distally, without basal tooth or lobe, not deflected ventrally; ventral tooth shorter than dorsal tooth. Apical antennal segment with spine-like tip. Genal sulcus shallow, often obscured by facial sculpture. Second radial segment shorter than 1st cubital cross-vein; recurrent vein antefurcal to interstitial; first radial segment arising from or distad of mid-stigma; stigma discrete, not merging imperceptibly with metacarpus distally; postnervellus long, distinctly sclerotized and pigmented; radiella absent at base, often indicated by fold or infumate trace distally.

Pronotum largely unsculptured and without median pit. Sternaulus crenulate; notauli complete to midpit and crenulate throughout. Postpectal carina usually present anteriorad mid coxae. Claws simple, with broad base. Petiole with deep glymma; dorsose present or absent. Spiracles of terga 2 + 3 near lateral margins (tergum 3 spiracle often not visible in dorsal view due to postmortem collapse of tergum). Hypopygium attenuate. Known species are parasitoids of tephritids, and have the ovipositor at least 1.5 times length of mesosoma.

Diagnosis.—*Rhynchostreres* differs from other large tropical opiines with short second cubital cell and broad, discrete stigma as follows: the occipital carina is absent in *Doryctobracon*; the ovipositor is sinuate in *Diachasmimorpha*, and the mandible has a well-developed flange along the ventral border; the pronotum has a large median pit in *Pseudorhinoplus* Fischer, 1972. *Rhynchostreres* was described for species with a distinctively protruding and medially reflected clypeus (Fischer, 1965; Van Achterberg, 1983). In *Rhynchostreres (Fopius)*, the clypeus does not protrude in this fashion. Nevertheless, some of the described species have the clypeus thickened ventral-medially, and I believe this is the initial step in the transformation to the condition found in *Rhynchostreres s. s.* Once the Afrotropical fauna becomes better known, I suspect the distinction between *Rhynchostreres s. s.* and *R. (Fopius)* will be less obvious. The *perisulcatus* species group (Fullaway, 1951; Wharton and Gilstrap, 1983) is somewhat intermediate between *Diachasmimorpha* and *R. (Fopius)*; and needs more detailed study before it can be accurately placed.

I include the following species in *Rhynchostreres (Fopius)*: *bevisi* (Brues), **New Combination**, *caudatus* (Szépligeti), **New Combination**, *desideratus* (Bridwell), **New Combination**, *niger* (Szépligeti), **New Combination**, *ottotomianus* (Fullaway), **New Combination**, and *pyknothorax* (Fischer), **New Combination**. At least three species

groups are evident, based on clypeal morphology and sculpture of the petiole and frons. I transfer also *clypeatus* (Bridwell) to *Rhynchostreres s. s.*, **New Combination**.

The subgeneric name is masculine and is a contraction formed from the words Fischer and Opus.

The type species has been misidentified in the past as *Biosteres caudatus*, and has recently been referred to as *caudatus* auct. (Wharton and Gilstrap, 1983; Steck et al., 1986). I have been unable to find an available name for this species, and it is therefore described as new.

Rhynchostreres (Fopius) silvestrii

Wharton, **NEW SPECIES**

Figs. 1, 2

Female.—*Head*: 1.66 ± 0.06 times broader than long; 1.35 ± 0.05 times broader than mesonotum; face with deep punctures and well-developed midridge, the latter extending between antennal bases as a low, sharp ridge; frons varying from nearly unsculptured in small individuals to extensively rugosopunctate (variation as in Wharton and Gilstrap, 1983; Figs. 10, 11); ocellar triangle margined, at least in part, and often completely, by a crenulate sulcus. Ventral margin of clypeus weakly convex, not noticeably thickened in middle. Eyes bare or apparently so, large, 2.36 ± 0.43 times longer than temples; temples receding in dorsal view. Antenna roughly 3.4 times longer than mesosoma; 1st flagellomere subequal to 2nd.

Mesosoma: 1.28 ± 0.05 times longer than high, 1.67 ± 0.04 times longer than broad. Median mesonotal lobe with 2 parallel, rugosopunctate grooves anteriorly; lateral mesonotal lobes hairy, and usually with scattered, deep punctures; with setae confined to margins in smaller species; notauli meeting in a narrow midpit, midpit varying from discrete furrow bordered anteriorly by striae to a small rugosostriate patch of sculpture. Propodeum rugose, sculpture variable, but often with obvious transverse elements on

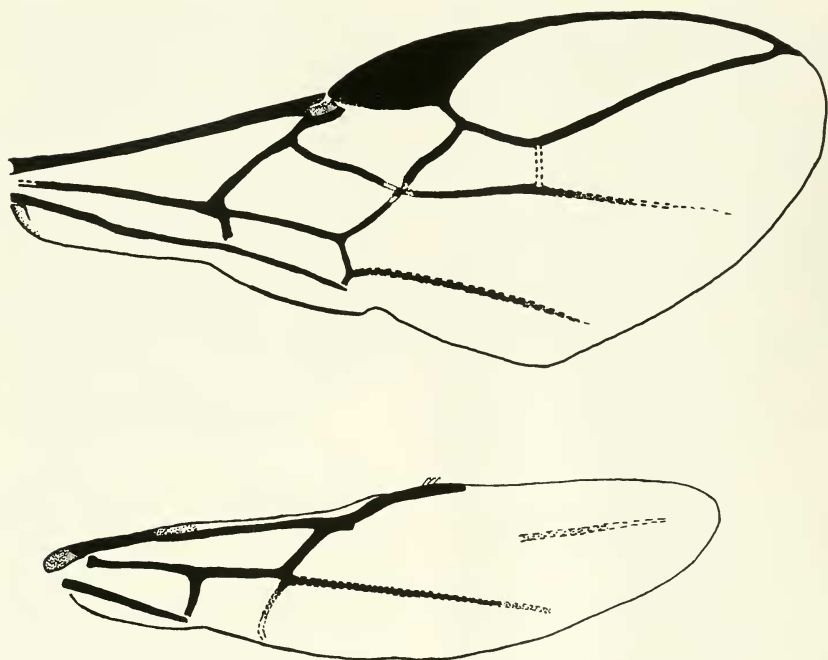


Fig. 1. Fore and hind wing of *Rhynchoστεres (Fopius) silvestrii*.

anterior face, sculpture on posterior, declivous face more uniform and slightly weaker; flange-like midridge present anteriorly. Sternaulus broad, deep, crenulate, but usually absent over posterior one-third; crenulate sculpture extending dorsally along anterior border of mesopleuron through subalar depression; posterior margin of mesopleuron noticeably crenulate ventrad of speculum, suture unsculptured or nearly so dorsad of speculum; mesopleural disc hairy; postpectal carina usually well-developed mid-ventrally.

Wing: 2nd radial segment 2.23 ± 0.29 times longer than 1st; 1st cubital cross-vein 1.22 ± 0.09 times longer than 2nd radial segment; 3rd radial segment extending nearly to wing tip; cubitus arising from about anterior 0.15 of basal vein, with 1st segment

sinuate; nervulus inclivous, usually postfurcal by less than its length, more rarely interstitial; junction between nervulus and basal vein thickened; recurrent vein ante-furcal to interstitial; parallel vein arising below middle of brachial cell. Postnervellus reclivous, though usually weakly recurved posteriorly, extending nearly to posterior margin as a well-developed, deeply impressed crease which is usually weakly pigmented.

Metasoma: Petiole 1.00 ± 0.05 times longer than apical width, apex 2.04 ± 0.14 times wider than base; finely striate, with a stronger median longitudinal carina sometimes evident; dorsal carinae well-developed basally, weak over posterior half, but usually extending to posterior margin, very weakly converging (at posterior margin, dis-

tance between carinae usually equal to or slightly less than distance to lateral margin); dorsope well-developed. Metasoma unsculptured beyond petiole. Ovipositor tip not narrowed, with barely developed dorsal notch and weak ventral serrations; 2.56 ± 0.15 times longer than mesosoma; ovipositor sheath dorsally with 2 rows of setae, each row with about 35 setae, setae shorter and about twice the density ventrally.

Color: Quite variable, generally reddish-brown to black; palps white to pale yellow; scape, pedicel, mandibles (except tips), all legs, and terga 2 + 3 yellow (remaining terga usually darker); clypeus, gena, orbits, pronotum, and antenna variable, but usually at least partly yellow; wings hyaline.

Male.—Somewhat darker than female, with all metasomal terga brown to black (rarely pale at extreme base of tergum 2). Otherwise essentially as in female, but with mesonotum slightly narrower, midpit often weakly developed to more or less absent, and petiole 1.21 ± 0.07 times longer than apical width (and thus distinctly longer and narrower than in female).

Length (exclusive of ovipositor): 2.0–3.5 mm.

Material examined.—Holotype ♀, CAMEROON: Centre-Sud Province, Nkolbisson, 22.VIII.1982, G. Steck, reared ex ripe coffee berries (USNM). Paratypes (TAMU, CNC, WIEN): Same locality, host plant, and collector as holotype: IV.18.1982 (1 ♀), V.1982 (1 ♂), 22.VIII.1982 (9 ♀, 4 ♂), 17.IX.1982 (2 ♀, 1?), 26.IX.1982 (2 ♀, 1 ♂), IX.1982 (5 ♀, 2 ♂), 3.X.1982 (4 ♀, 2 ♂), 10.X.1982 (6 ♀, 6 ♂), 17.X.1982 (6 ♂), 26.X.1982 (4 ♀, 1 ♂), X.1982 (10 ♀, 46 ♂), 1.XI.1982 (2 ♀, 3 ♂), 8.XI.1982 (2 ♀, 1 ♂), 15.XI.1982 (4 ♀, 10 ♂), 22.XI.1982 (4 ♀, 13 ♂), XI.1982 (3 ♀, 2 ♂); CAMEROON: Centre-Sud Prov., Akonolinga, VI.1982 (1 ♀, 1 ♂); 24.VII.1982 (1 ♀); 28.VIII.1982 (1 ♂), VIII.1982 (5 ♀, 13 ♂); IX.1982 (1 ♀); X.1982 (2 ♀), G. Steck, reared from *Coffea robusta* berries, with *Trirhithrum coffeae* (Bezzi) (Tephritidae) as probable host; Ouest Prov.,

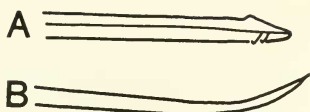


Fig. 2. Ovipositor tips. A, *Rhynchosteres (Fopius) silvestrii*. B, *R. (F.) caudatus* (Szépligeti).

Bafoussam, 30.VI.1982 (1 ♀), 13.VII.1982 (1 ♀), G. Steck, reared from *Coffea arabica* berries; Centre-Sud Prov., Etoug-Ebe, 26.V.1982, G. Steck, reared from *Dacus* on squash (1 ♀); Yaounde, Agr. Res. Inst., 2.VI.1980, F. E. Gilstrap, W. G. Hart, & D. Perkins, from coffee berries (12 ♀). COSTA RICA: Turrialba, 12.XI.1982, M. Fischel, recovered from release site in coffee plantation (1 ♂); shipped to Costa Rica from Cameroon, via Texas, IX.23.1982 (3 ♀), XI.1982 (3 ♀). TOGO: Kpime-Seva, 16.XII.1981, G. Steck, from *Coffea robusta* berries (1 ♀).

The material collected in 1982 was shipped through the Texas A&M University (TAMU) quarantine as #s T82001, T82009, T82013, T82031, T82033, T82034, T82036, T82039, T82040, T82041, T82044, T82046, and T82047. Further details are provided by Steck et al. (1986).

Diagnosis.—This species has frequently been reared with *R. (F.) caudatus* from a variety of tephritids in West Africa; and has often been confused with the latter (Wharton and Gilstrap, 1983; Steck et al., 1986). In *caudatus*, the dorsope is not developed, the clypeus tends to be thickened medially along the ventral margin, the ovipositor is slightly shorter (usually less than twice length of mesosoma), the frons bears a very distinctive transverse row of deep, close-set punctures on an otherwise unsculptured background (frons weakly to heavily rugose in *silvestrii*), and the median mesonotal lobe has only a single longitudinal groove medially. The two species probably attack different immature stages of their host tephritids since the ovipositor is exceptionally

narrow at the tip in *caudatus* (Fig. 2). A similar situation was described in detail by Van den Bosch and Haramoto (1951) for members of the *persulcatus* species group.

A much closer relationship exists between *silvestrii* and *pyknothorax*, and these two species are difficult to separate. However, the latter, a South African species, lacks punctures and setae on the lateral lobes of the mesonotum, and the clypeus is slightly thickened mid-ventrally.

Discussion.— This species is named in honor of the Italian entomologist Filippo Silvestri, who did much to further our knowledge of opiine biology through his biological control efforts. The above measurements (given as a mean \pm standard deviation) are based on 20 specimens each.

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LITERATURE CITED

- Ashmead, W. H. 1900. Some changes in generic names in the Hymenoptera. *Can. Entomol.* 32: 368.
- Brues, C. T. 1926. Studies on Ethiopian Braconidae with a catalogue of the African species. *Proc. Am. Acad. Arts Sci.* 61: 205-436.
- Cameron, P. 1903. Descriptions of new genera and species of Hymenoptera from India (continuation). *Z. Hym. Dipt.* 3: 9-16, 177-184, 298-304, 337-344.
- . 1910. On some Asiatic species of the subfamilies Braconinae and Exothecinae in the Royal Berlin Museum. *Soc. Entomol.* 25: 11-12, 14-16, 19-20, 22-23, 25-26.
- De Santis, L. 1967. Catalogo de los Himenopteros argentinos de la serie Parasitica, incluyendo Bethyloidea. *Com. Invest. Cient. Prov. Buenos Aires, La Plata*, pp. 33-34.
- Fischer, M. 1959. Die europäischen Opiinae (Hymenoptera, Braconidae). *Acta Entomol. Mus. Nat. Pragae* 33: 241-263.
- . 1963a. Die Opiinae der äthiopischen Region. *Beitr. Entomol.* 13: 194-221, 662-747.
- . 1963b. Das Genus *Austroopius* Szépligeti (Hymenoptera, Braconidae, Opiinae). *Mitt. Zool. Mus. Berlin* 39: 173-186.
- . 1964. Die Opiinae der nearktischen Region (Hymenoptera, Braconidae). I. Teil. *Polski Pismo Entomol.* 34: 197-530.
- . 1965. Zwei neue Opiinen—Gattungen aus dem Kongo (1. Beitrag ueber die Opiinae des Musée Royal de l'Afrique Centrale) (Hymenoptera, Braconidae). *Rev. Zool. Bot. Afr.* 71: 309-323.
- . 1966. Revision der indo-australischen Opiinae. Dr. W. Junk B. V., The Hague. 167 pp.
- . 1967a. Zusammenfassung der neotropischen Opiinae mit Ausschluss der Gattung *Opius* Wesm. (Hymenoptera, Braconidae). *Beitr. Neotrop. Fauna*. 5: 1-21.
- . 1967b. Redescripciones von einigen Opiinen (Hymenoptera, Braconidae). *Arbeitsgemeinschaft Oesterr. Entomol.* 19: 59-69.
- . 1971. *Hym. Braconidae. Index of World Opiinae. Index of entomophagous insects.* Le Francois, Paris. 189 pp.
- . 1972. *Hymenoptera Braconidae (Opiinae I). Das Tierreich* 91: 1-620.
- . 1977. *Hymenoptera Braconidae (Opiinae II—Amerika). Das Tierreich* 96: 1-1001.
- Foerster, A. 1862. *Synopsis der Familien und Gattungen der Braconen.* *Verh. naturh. Ver. preuss. Rheinl.* 19: 225-288.
- Fullaway, D. T. 1951. Review of the Indo-Australasian parasites of the fruit flies (Tephritidae). *Proc. Haw. Entomol. Soc.* 14: 243-250.
- Gahan, A. B. 1915. A revision of the North American ichneumon-flies of the subfamily Opiinae. *Proc. U. S. Natl. Mus.* 49: 63-95.
- Holiday, A. H. 1837. *Essay on Parasitic Hymenoptera.* *Entomol. Mag.* 4: 203-221.
- Hendrikse, A. 1980. A method for mass rearing two braconid parasites (*Dacnusa sibirica* and *Opius pallipes*) of the tomato leafminer (*Liriomyza byroniae*). *Meded. Fac. Landbou. Rijksuniv. Gent* 45: 563-571.
- Marshall, T. A. 1891. A monograph of the British Braconidae. Part IV. XXIII. Opiides. *Trans. Entomol. Soc. Lond.* 1891: 7-61.
- Martelli, G. M. 1937. *Contributo alla conoscenza*

- biologica del *Dacus oleae* Rossi e dei suoi parassiti in Tripolitania. Agric. Colon. 31(A): 149-155.
- Muesebeck, C. F. W. 1931. Descriptions of a new genus and eight new species of ichneumon-flies with taxonomic notes. Proc. U.S. Natl. Mus. 79: 1-16.
- . 1967. Family Braconidae, pp. 27-60. In Krombein, K. V. and B. D. Burks. Hymenoptera of America north of Mexico, synoptic catalog. Second Supplement. USDA Agric. Mon. 2. 584 pp.
- Muesebeck, C. F. W. and L. M. Walkley. 1951. Family Braconidae, pp. 90-184. In Muesebeck, C. F. W., K. V. Krombein, and H. K. Townes. Hymenoptera of America north of Mexico, synoptic catalog. USDA Agric. Mon. 2. 1420 pp.
- Paoli, G. 1934. *Diachasma brevistyli* Paoli, pp. 349-351. In Prodrómo di entomologia agraria della Somalia Italiana. Firenze. Istituto Agricolo Coloniale Italiano.
- Papp, J. 1985. Taxonomical and faunistical novelties of the Opiinae from the Old World tropics (Hymenoptera: Braconidae). Acta Zool. Hung. 31: 185-216.
- Roman, A. 1910. Notizen zur Schlupfwespenammlung des schwedischen Reichsmuseums. Entomol. Tidsk. 31: 109-196.
- Schulz, W. A. 1911. Zweihundert alte Hymenopteren. Zool. Ann. 4: 1-220.
- Shenefelt, R. D. 1970. Pars 5. Braconidae 2. Helconinae, Calyptinae, Mimagathidinae, Triaspininae. In Ferriere, Ch. and J. van der Vecht, eds., Hymenopterorum catalogus (nova editio). Dr. W. Junk B. V., The Hague, pp. 177-306.
- . 1975. Pars 12. Braconidae 8. Exothecinae Rogadinae. In van der Vecht, J. and R. D. Shenefelt, eds., Hymenopterorum catalogus (nova editio). Dr. W. Junk B. V., The Hague, pp. 1115-1262.
- Steck, G. J., F. E. Gilstrap, R. A. Wharton, and W. G. Hart. 1986. Braconid parasitoids of Tephritidae (Diptera) infesting coffee and other fruits in West-Central Africa. Entomophaga 31: 59-67.
- Szépligeti, G. 1907. Collections faites par M. le Baron Maurice de Rothschild dans l'Afrique Orientale. Bull. Mus. Hist. Nat. Paris 1907: 34-36.
- . 1911. Braconidae der I. Zentral-Afrika-Expedition. Wiss. Ergebn. dtsch. Zentr. Afr. Exped. 3: 393-418.
- . 1914. Afrikanische Braconiden des Koenigl. Zoologischen Museums in Berlin. Mitt. zool. Mus. Berlin 7: 153-230.
- Thomson, C. G. 1895. LII. Bidrag till Braconidernas kannedom. Opusc. Entomol. 20: 2141-2339.
- Van Achterberg, C. 1983. A new species of *Rhynchosteres* Fischer from Zaire (Hymenoptera, Braconidae). Zool. Meded. 57: 91-95.
- Van den Bosch, R. and F. H. Haramoto. 1951. *Opius oophilus* Fullaway, an egg-larval parasite of the Oriental Fruit Fly discovered in Hawaii. Proc. Haw. Entomol. Soc. 14: 251-255.
- Wesmael, C. 1835. Monographie des Braconides de Belgique. Nouv. Mém. Acad. R. Bruxelles 9: 1-252.
- . 1838. Monographie des Braconides de Belgique. Nouv. Mém. Acad. R. Bruxelles 11: 5-166.
- Wharton, R. A. and F. E. Gilstrap. 1983. Key to and status of opine braconid (Hymenoptera) parasitoids used in biological control of *Ceratitis* and *Dacus s. l.* (Diptera: Tephritidae). Ann. Entomol. Soc. Am. 76: 721-742.
- Wharton, R. A. and P. M. Marsh. 1978. New World Opiinae (Hymenoptera: Braconidae) parasitic on Tephritidae (Diptera). J. Wash. Acad. Sci. 68: 147-167.